AMENDMENTS TO THE CLAIM

This listing of claims replaces all previous listing and versions of claims in this application.

1. **(Canceled)**

2. **(Currently Amended)** The method of claim [[1]] 34, wherein said [[neuronal]] neuron deficiency arises from a disorder selected from the group consisting of abnormalities of the central autonomic systems, congenital disorders and disorders arising from teratogen exposure, demyelinating diseases, diseases of peripheral nerves, disorders of the hypothalamus and pituitary, disorders of movement, disorders of the spinal cord and vertebral column, epilepsy, hypoxia, increased intracranial pressure, infectious disease, neoplasia, neurodegenerative disorders, neuronal disorders associated with aging and senile dementia, nutritional disorders, perinatal neuropathologies, radiation damage, schizophrenia, single gene disorders, toxic disorders, trauma, vascular disease, and psychiatric disorders other than schizophrenia.

3. **(Currently Amended)** The method of claim 2, wherein said [[neuronal]] neuron deficiency is not a neuron deficiency arising from a disorder selected from the group consisting of: a lysosomal or peroxisomal disorder, Zellweger's disease, human immunodeficiency virus (HIV) infection, multiple sclerosis (MS), adrenoleucodystrophy, adrenomyeloneuropathy, a metachromatic leucodystrophy, a sulphatide lipidosis, globoid cell leucodystrophy, amyotrophic lateral sclerosis, amyotrophic lateral sclerosis with frontal lobe dementia, a bone marrow ablation treatment, lymphoreticular disorders, metastases of tumors which do not arise in the nervous system, infantile acid maltase deficiency (Pompe's disease), Ceroid lipofuscinosis, a deficiency of GM2 gangliosidase, Sanfilippo's disease, leucodystrophy, systemic lupus erythematosus, thrombophilia associated with antiphospholipid antibodies or polycythemia, and anemia including Sickle cell disease, beta-thalassemia major, and other thalassemias.

4. **(Currently Amended)** The method of claim 34 [[1]], wherein said bone marrow[[-derived]] cells are autologous.

5. **(Currently Amended)** The method of claim 4, wherein said autologous bone marrow[[-derived]] cells are genetically modified.

6. (**Currently Amended**) The method of claim 34 [[1]], wherein said bone marrow[[-derived]] cells are allogeneic.

7. (**Currently Amended**) The method of claim 6, wherein said allogeneic bone marrow[[-derived]] cells are genetically modified.

8. (**Currently Amended**) The method of claim 34 [[1]], wherein said agent is ~~bone marrow-derived cells are~~ administered in conjunction with a neuronal factor.

9. (**Currently Amended**) The method of claim 8, wherein said neuronal factor is selected from the group consisting of: nerve growth factor (NGF), brain-derived neurotrophic factor (BDNF), neurotrophin-3, -4, -5, -4/5 and -6 (NT-3, -4, -5, -4/5, -6), ciliary neurotrophic factor (CNTF), glial-derived neurotrophic factor (GDNF), growth promoting activity (GPA), luteinizing hormone releasing hormone (LHRH), KAL gene, insulin, insulin-like growth factor-I-alpha, I-beta, and -II (IGF-I-alpha, I-beta, -II), interleukins ~~(e.g., IL-2, IL-6, and the like)~~, platelet derived growth factors ~~(including homodimers and heterodimers of PDGF A, B, and v-sis)~~, retinoic acid ~~(especially all-trans-retinoic acid)~~, fibroblast growth factors (FGFs~~, e.g., FGF-1, -2, -3~~), epidermal growth factor (EGF), leukemia inhibitory factor (LIF), the neuropeptide CGRP, vasoactive intestinal peptide (VIP), gliobastoma-derived T cell suppressor factor (GTSF), transforming growth factor alpha, epidermal growth factor, transforming growth factor betas ~~(including TGF-.beta.1, -.beta.2, -.beta.3, -.beta.4, and -.beta.5)~~, vascular endothelial growth factors ~~(including VEGF-1, -2, -3, -4, and -5)~~, stem cell factor (SCF), neuregulins and neuregulin family members ~~(including neuregulin-1 and heregulin)~~, netrins, galanin, substance P, tyrosine, somatostatin, enkephalin, ephrins, bone morphogenetic protein (BMP) family members ~~(including BMP-1, -2, -3 and -4)~~, semiphorins, glucocorticoids ~~(including dexamethasone)~~, progesterone, putrescine, supplemental serum, extracellular matrix factors ~~(including laminins, fibronectin, collagens, glycoproteins, proteoglycans and lectins)~~, cellular adhesion molecules ~~(including N-CAM, L1, N-cadherin)~~, and neuronal receptor ligands ~~(including receptor agonists, receptor antagonists, peptidomimetic molecules, and antibodies)~~.

10. (**Currently Amended**) The method of claim 8, wherein said neuronal factor is administered with the agent that mobilizes bone marrow cells ~~bone marrow-derived cells~~.

11. (**Currently Amended**) The method of claim 8, wherein said neuronal factor is administered separately from said agent that mobilizes bone marrow cells ~~bone marrow-derived cells~~.

12. (**Original**) The method of claim 11, wherein said neuronal factor is administered intrathecally.

13. (**Currently Amended**) The method of claim 34 [[1]], further comprising the step of mildly damaging the nervous system of the individual.

14-18. (**Canceled**)

19. (**Currently Amended**) The method of claim 34 [[1]], wherein said agent that mobilizes bone marrow cells is ~~bone marrow-derived cells are~~ administered by direct administration into a site in said subject's nervous system.

20. (**Original**) The method of claim 19, wherein said site in the subject's nervous system is in the subject's central nervous system (CNS).

21. (**Currently Amended**) The method of claim 34 [[1]], wherein said subject is a human.

22-33. (**Canceled**)

34. (**Currently amended**) A method for ~~treating a neuronal deficiency~~ producing a Purkinje/bone marrow-derived heterokaryon, comprising: administering an agent that mobilizes bone marrow cells ~~a bone marrow cell mobilization therapy~~ to an individual having a neuron deficiency, wherein the agent ~~administering of the bone marrow cell mobilization therapy~~ induces formation of ~~bone marrow-derived neurons~~ the Purkinje/bone marrow-derived heterokaryon in the nervous system of the individual ~~subject; and ameliorating at least one symptom of the neuronal deficiency~~.

35-38. (**Canceled**)

39. (**Currently Amended**) The method of claim 34, wherein the Purkinje/bone marrow-derived heterokaryon is ~~bone marrow-derived neuron is a neuron~~ derived by fusion of a bone marrow-derived cell with a Purkinje neuron.

40. (**Canceled**)

41. (New) The method of claim 39, wherein the fusion of the bone marrow-derived cell with the Purkinje neuron results in the activation of Purkinje neuron-specific gene expression.

42. (New) The method of claim 41, wherein the Purkinje/bone marrow-derived heterokaryon does not express a hematopoietic marker protein selected from the group consisting of CD45, CD11b, F4/80, and Iba1 at a time greater than three months post-heterokaryon formation.

43. (New) The method of claim 34, wherein the Purkinje/bone marrow-derived heterokaryon exhibits the morphology of a functioning Purkinje neuron.

44. (New) The method of claim 34, wherein the Purkinje/bone marrow-derived heterokaryon does not express a hematopoietic marker selected from the group consisting of CD45, CD11b, F4/80, and Iba1.

45. (New) The method of claim 34, wherein the agent is G-CSF.

46. (New) The method of claim 34, wherein the agent is GM-CSF.

47. (New) The method of claim 34, wherein the agent is Flt-3 ligand.

48. (New) The method of claim 34, wherein the agent is MIP.alpha.

49. (New) The method of claim 34, wherein the agent is an anti-VLA-4 antibody.

50. (New) The method of claim 34, wherein the agent is an anti-VCAM-1 antibody.